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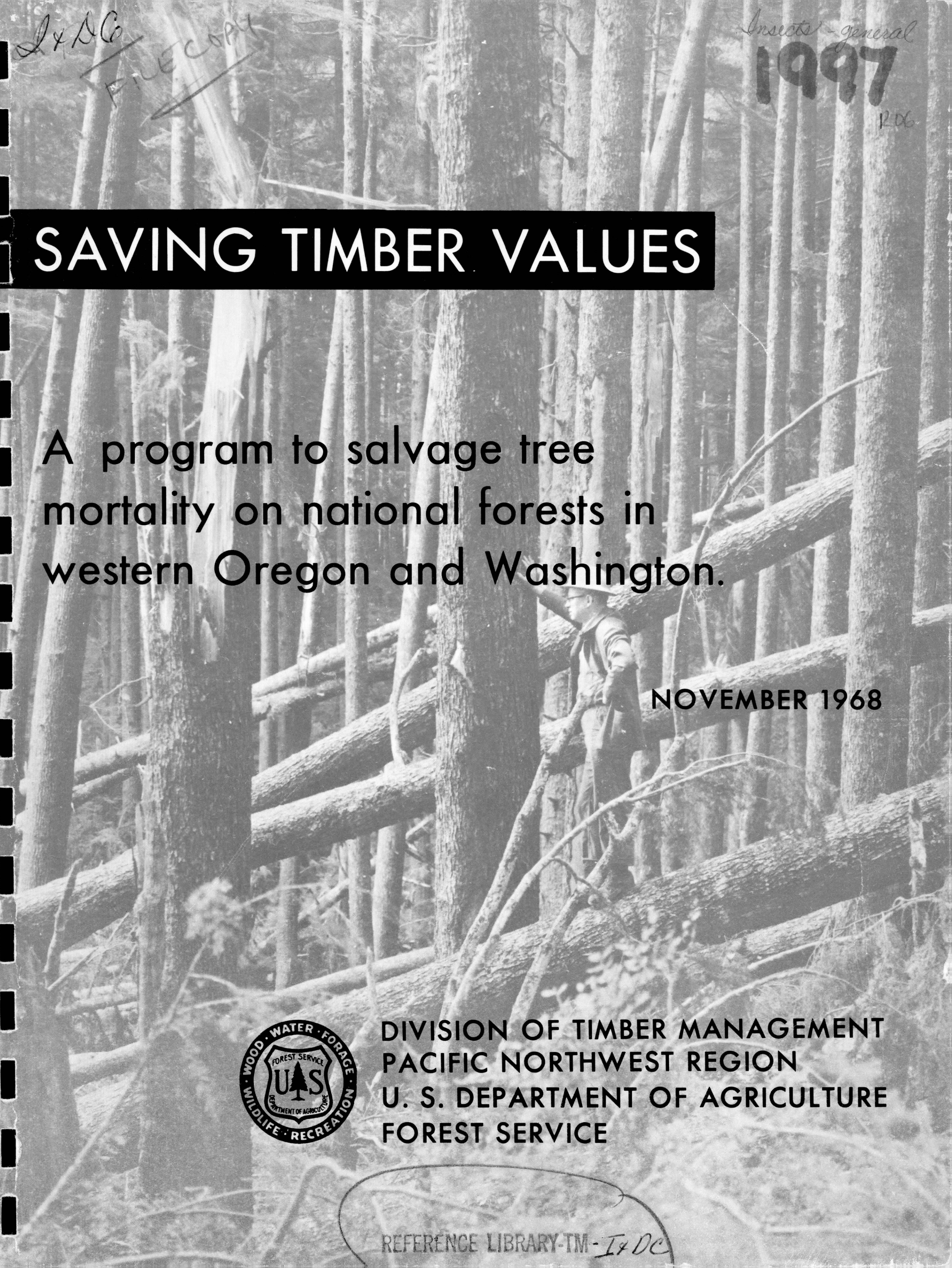
SAVING TIMBER VALUES



A program to salvage tree mortality on national forests in western Oregon and Washington.

NOVEMBER 1968

DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

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SAVING TIMBER VALUES

-- A PROGRAM TO SALVAGE TREE MORTALITY ON NATIONAL FORESTS IN WESTERN OREGON AND WASHINGTON

PREPARED BY

DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

FOREWORD

A conservative estimate indicates that 721 million board feet of timber has been killed by insects, disease, or is dead and dying on just six National Forests in western Oregon and Washington. The losses vary from single trees or small groups of trees to heavy mortality over large areas.

Only about 260 million board feet of this material is now accessible. With extensive road development, more will become accessible. Some will never be recovered because of its location in inoperable or dedicated areas.

The Forest Service is firmly committed to salvaging all dead and down material that can be economically harvested. To date our efforts have not been totally effective, as evidenced by the continued tree mortality in developed areas on National Forest land. Changes in policies, practices, and attitudes of the Forest Service and the forest industry are needed to bring about an effective solution to the timber salvage problem.

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  - Rogue River N.F.
  - Siskiyou N.F.

INTRODUCTION

It is the purpose of this report to:

(1) Illustrate the extent and amount of current Douglas-fir beetle kill and other insect-caused mortality on the Mt. Baker, Gifford Pinchot, Mt. Hood, Umpqua, Rogue River, and Siskiyou National Forests.

(2) Recommend possible solutions to the timber salvage problem on National Forest lands in Oregon and Washington.

OBJECTIVES

The Forest Service objective in the management of Forest lands places top priority on the detection and removal of salvage material. Trees which have been killed by fire, insects, or other natural causes must receive immediate attention if the maximum economic returns are to be achieved. Rapid action is also necessary to minimize future insect damage.

On September 25, 1968, Regional Forester Connaughton established written priorities for the 1969 Fiscal Year Timber Sale Program. These instructions provide that preparation and selling of beetle-infested and recent fire-killed timber must receive first priority. Older dead and down timber falls below regular green timber sales in priority.

As further evidence of his commitment to a salvage program, additional instructions pertaining to selling and harvesting of potential losses were issued on November 4, 1968.

Problem:

(1) Prompt detection of insect-infested trees, either as single trees or in groups of trees.

(2) The prompt harvesting of such insect-infested trees or those recently killed by insects or from other causes such as disease, fire, or windthrow. This will require a high level of cooperation between the Forest Service and Industry for successful completion.

HISTORY OF DOUGLAS-FIR BEETLE OUTBREAKS

Insect attacks on the timber of the National Forests of Region 6 have been occurring for many years. All outbreaks have been associated with serious stand disturbances. During the last forty years, the following outbreaks have been recorded in the Northwest:

Area Infested	Dates	Stand Disturbance
Northwest Oregon	1935-37	1933 Tillamook Burn
Western Oregon & Washington	1950-53	1949-50, 1950-51 Storms
Southwest Oregon	1957-59	1956 Windbreak
South central Washington	1958-59	1956-57 Windbreak
Southwest Oregon	1963-68	1962 Hurricane & subsequent windthrow
South central Washington	1965-68	1964 Winter storms followed by drought
Northwest Washington	1965-68	1964 Winter storms & subsequent drought
Western Oregon & Washington	1965-present	1964 Winter storms & subsequent drought

Development of the Current Douglas-fir Beetle Outbreak

Winter rains and floods washed down groups of trees throughout the Cascade and Coast Ranges in December 1964. This distressed timber was attacked by beetles in the spring and summer of 1965. Winter winds in 1965-1966 broke the tops out of many additional trees and caused more than the normal amount of blowdown. Beetles emerging from the flood-damaged trees in 1966 attacked the new broken tops, blowdown and some standing trees. Drought conditions coupled with very high beetle populations in 1967 resulted in extensive tree killing in 1968, as shown in the following map and in Table 1.

Biological Evaluation of the Douglas-fir Beetle Outbreak and Prognosis for 1969-1971

Surveys in the fall of 1968 indicate that the ratio of "red tops" (abandoned) trees to "green" (infested) trees in the various Forests is as follows:

National Forest	Ratio	Trend
	(Abandoned:Infested)	
Gifford Pinchot	1:1	Static
Umpqua	9:1	Down
Rogue River	1½:1	Static
Siskiyou	2½:1	Down
Mt. Baker	--	--
Mt. Hood	3:1	Down

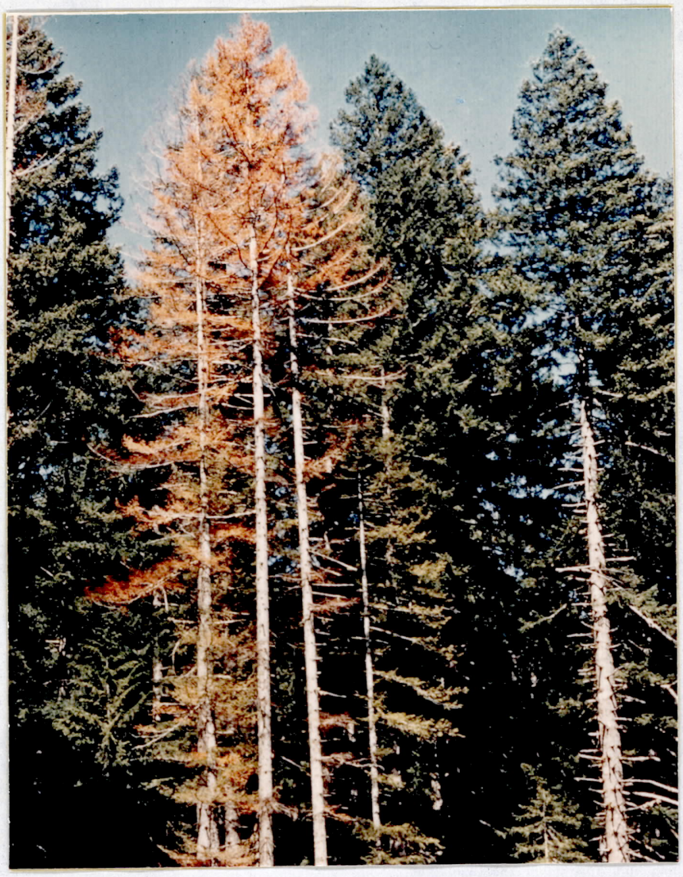
Even though the trend of the infestation appears to be downward in most areas, we expect a substantial additional volume of beetle kills will show up in 1969.

It is our prediction that the amount of losses will taper off sharply in 1970, unless some additional stand disturbances occur.

The extent of other insect-caused mortality is shown in the Appendix, Table 5.

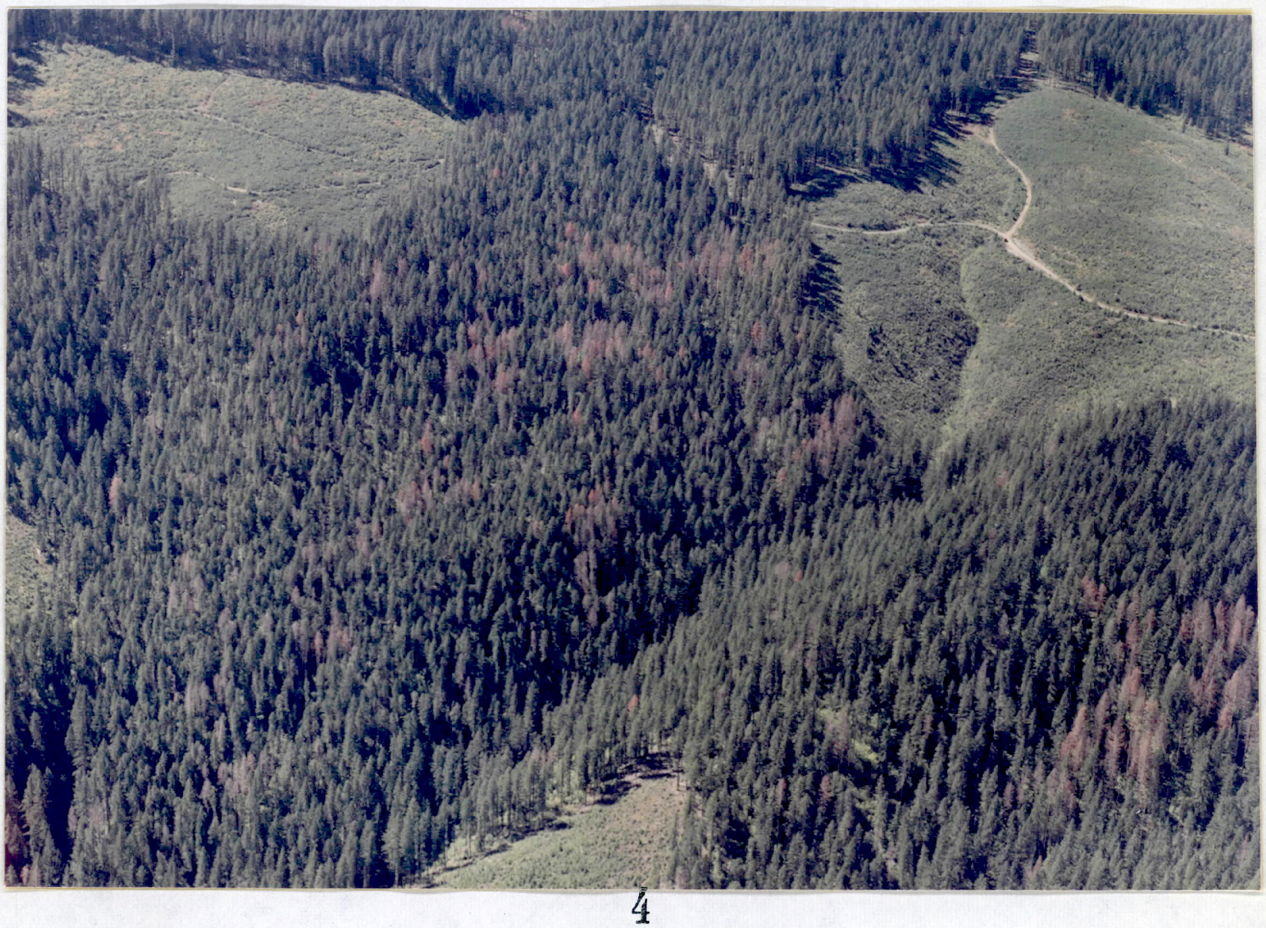
Table 1.--Trend of Douglas-fir beetle infestations on selected National Forests, 1964-1968

National Forest	Year				
	1964	1965	1966	1967	1968
	- - - - Acres - - - -				
Mt. Baker	0	160	200	2,200	4,550
Gifford Pinchot	460	2,930	2,980	13,240	24,770
Mt. Hood	450	400	760	580	49,400
Umpqua	2,360	30,260	1,820	5,960	35,080
Rogue River	240	2,580	2,240	9,420	13,690
Siskiyou	6,760	15,200	2,460	16,160	15,450
Total	10,270	51,530	10,460	47,560	142,940



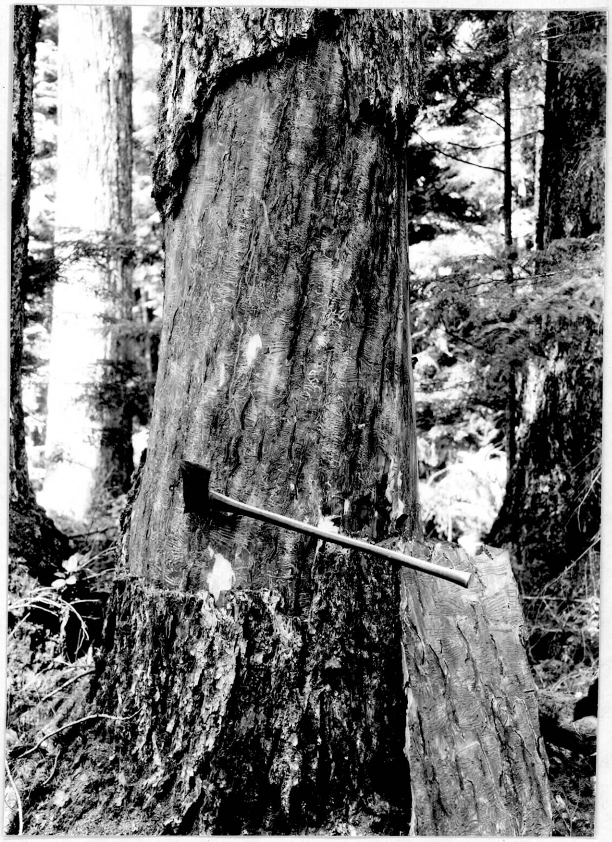
The Douglas-fir beetle attacks trees in small groups (left) and many trees on large areas (below).

Aerial oblique taken on Wind River Ranger District, Gifford Pinchot National Forest, Washington.



Scattered single windthrown trees foster beetle build-up. Salvage of these trees is uneconomical (right).

Beetles breed in windthrown timber and emerge the next year to attack standing trees. Douglas-fir beetle-killed tree (right).



TIMBER MORTALITY - ACCESSIBILITY, ACREAGE AND VOLUMES

It is estimated that mortality in 1969 from the current Douglas-fir beetle infestation as well as from other insects and diseases will total 721 million board feet of merchantable timber on the six National Forests covered in this report. Table 2 shows the estimate of mortality in terms of area and volume affected, by accessibility classes, for calendar years 1969 through 1972. Three access classes have been recognized. Physical as well as economic accessibility was considered in developing the classification.

Accessible mortality volume is that timber which is available for harvest using existing roads with only minor spur road construction, if any, needed.

Accessible with road development is mortality volume that can be salvaged within a reasonable time though road construction will be required. Such road construction is considered possible within a short enough period that economic values will not have deteriorated sufficiently to prohibit salvage.

Inaccessible mortality volume is that timber of commercial quality which cannot be salvaged because length of time required to provide access is such that economic values have deteriorated too much, or the timber is so scattered that adequate access cannot be justified from a cost/benefit standpoint, or the timber is located in dedicated areas where timber cutting is prohibited.

It is estimated that of the 721 million board feet of 1969 mortality, some 36 percent is accessible, about 30 percent is economical to salvage with road development and the remaining 34 percent is inaccessible.

Photographs on the pages following Table 2 illustrate the three classes of access discussed above. A map of Oregon and Washington following Table 2 depicts the location of the current Douglas-fir beetle infestation.

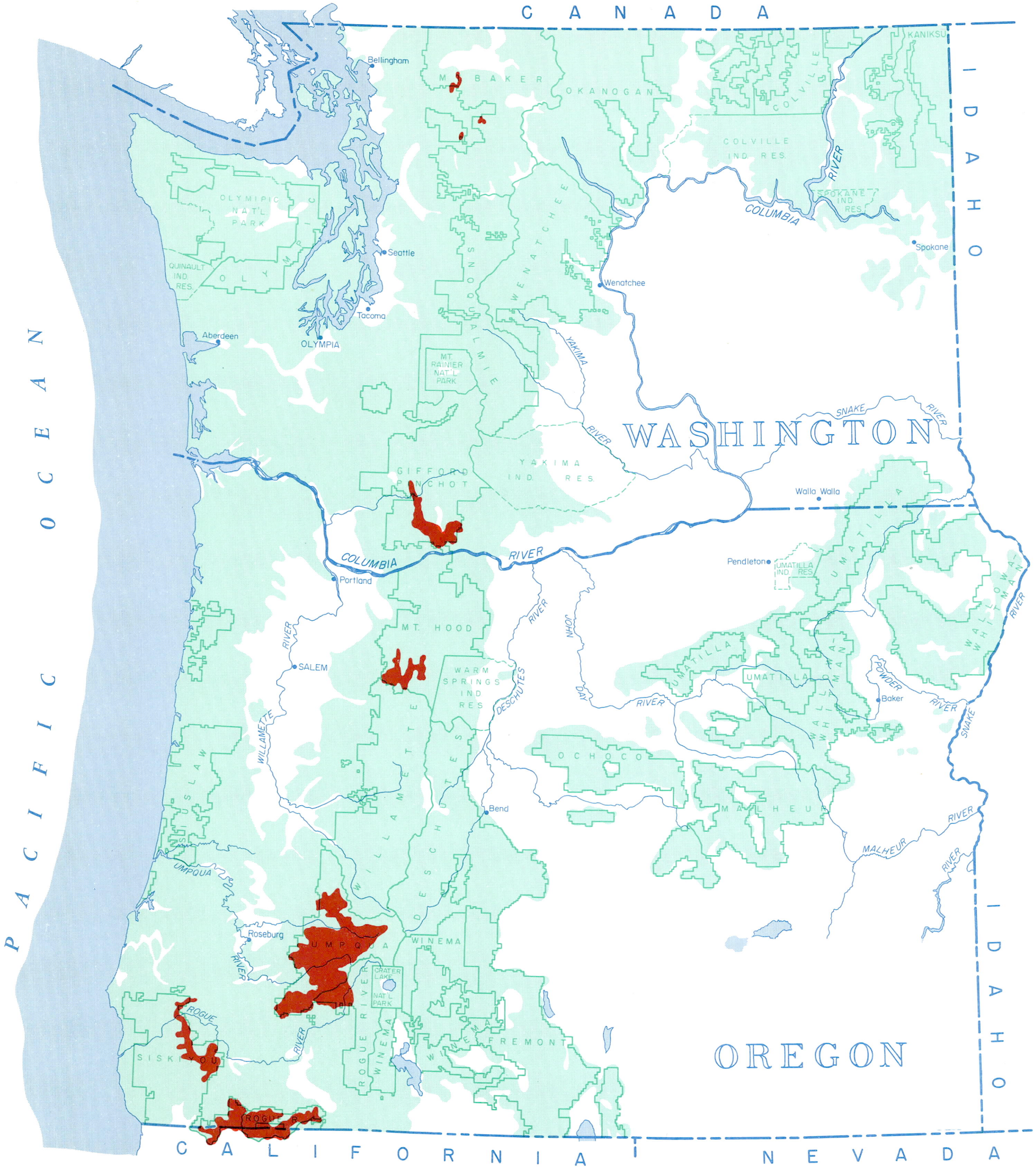
Table 2.--Accessibility of Douglas-fir beetle and other insect mortality 1969 - 1972

Fiscal Year	Accessible 1/		Accessible 2/ with road development		Inaccessible 3/		TOTAL	
	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	M Acres	MM bd. ft.	M Acres	MM bd. ft.	M Acres	MM bd. ft.	M Acres	MM bd. ft.
1969	343.3	258.0	98.1	214.8	355.5	248.3	796.9	721.1
1970	343.4	171.2	89.2	233.0	258.1	247.3	690.7	651.5
1971	347.9	143.0	73.2	225.1	222.3	244.5	643.4	612.6
1972	352.0	123.7	61.2	175.7	211.5	257.4	624.7	556.8
Total	1,386.6	695.9	321.7	848.6	1,047.4	997.5	2,755.7	2,542.0

1/ Tree mortality is available for harvest by existing roads or minor spur roads.

2/ Mortality is available for harvest within reasonable time with road construction.

3/ Inoperable with present logging methods. Includes dedicated areas.


CANADA
IDAHO
PACIFIC OCEAN
CALIFORNIA
NEVADA
WASHINGTON
OREGON
Bellingham
MT. BAKER
OKANOGAN
COLVILLE
KANIKSU
COLVILLE IND. RES.
SPOKANE IND. RES.
COLUMBIA RIVER
Spokane
OLYMPIC NAT'L PARK
OLYMPIC
QUINAULT IND. RES.
Seattle
Tacoma
Aberdeen
OLYMPIA
SNOQUALMIE
WENATCHEE
Wenatchee
YAKIMA RIVER
MT. RAINIER NAT'L PARK
YAKIMA IND. RES.
SNAKE RIVER
GIFFORD PINCHOT
Walla Walla
COLUMBIA RIVER
Portland
Pendleton
UMATILLA IND. RES.
UMATILLA
WALLOWA
WHITMAN
SNAKE RIVER
MT. HOOD
RIVER
JOHN DAY RIVER
WILLAMETTE RIVER
SALEM
WARM SPRINGS IND. RES.
DESCHUTES
POWDER RIVER
Baker
SIUSLAW
OCHOCO
WILLAMETTE
DESCHUTES
Bend
MALHEUR
MALHEUR RIVER
UMPQUA
Roseburg
UMPQUA RIVER
WINEMA
CRATER LAKE NAT'L PARK
ROGUE RIVER
ROGUE
SISKIYOU
FREMONT
RIVER

10 0 10 20 30 40 50
SCALE IN MILES

LEGEND

🟩 Forested Areas

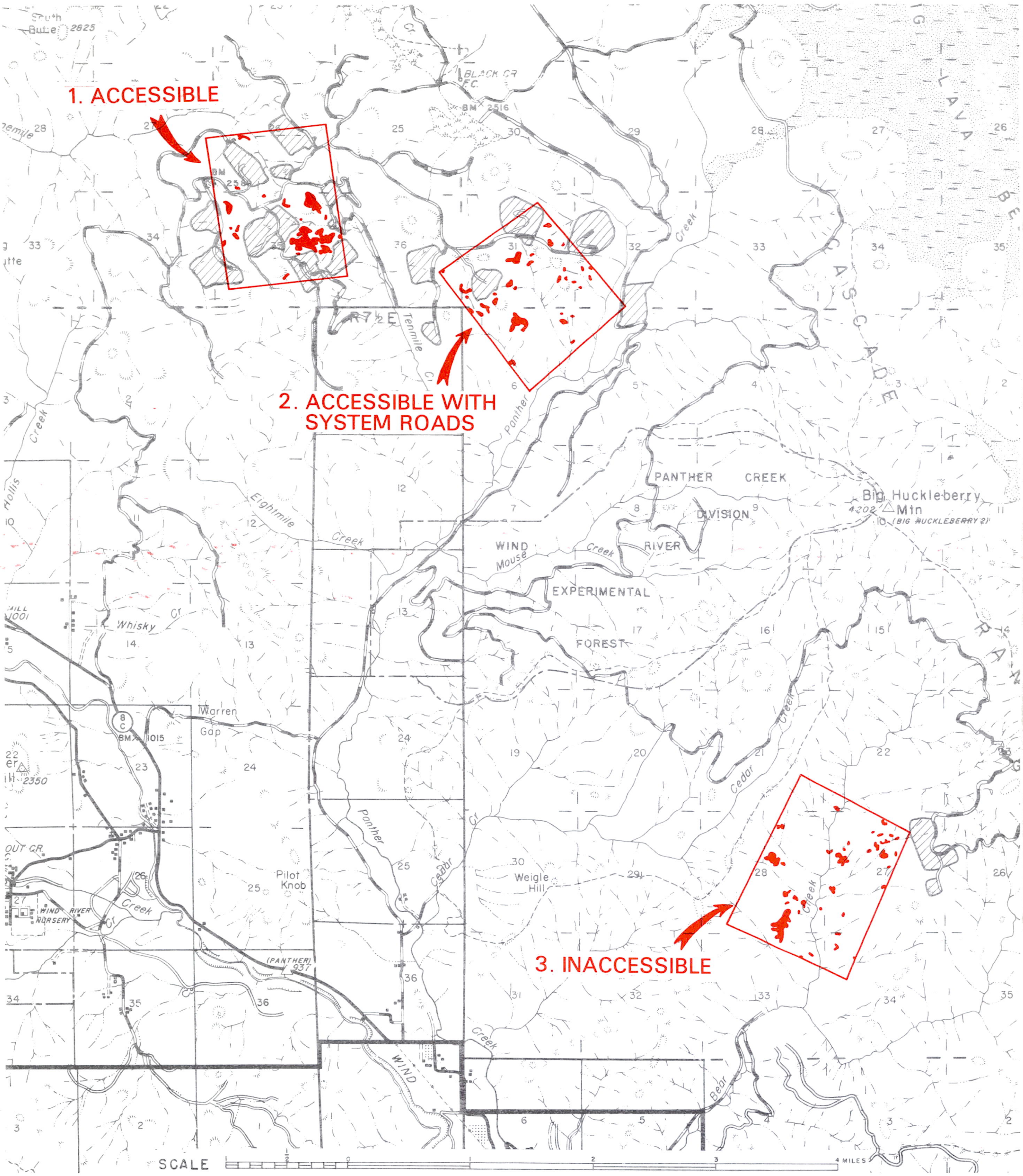
— National Forest Boundaries

- - - Reservation and Park Boundaries

U.S. FOREST SERVICE
PORTLAND, OREGON

1968
GENERALIZED DOUGLAS-FIR BEETLE INFESTATIONS

NATIONAL FOREST	ACRES
MOUNT HOOD	49,400
UMPQUA	35,080
GIFFORD PINCHOT	24,770
SISKIYOU	15,450
ROGUE RIVER	13,690
MOUNT BAKER	4,550
TOTAL	142,940

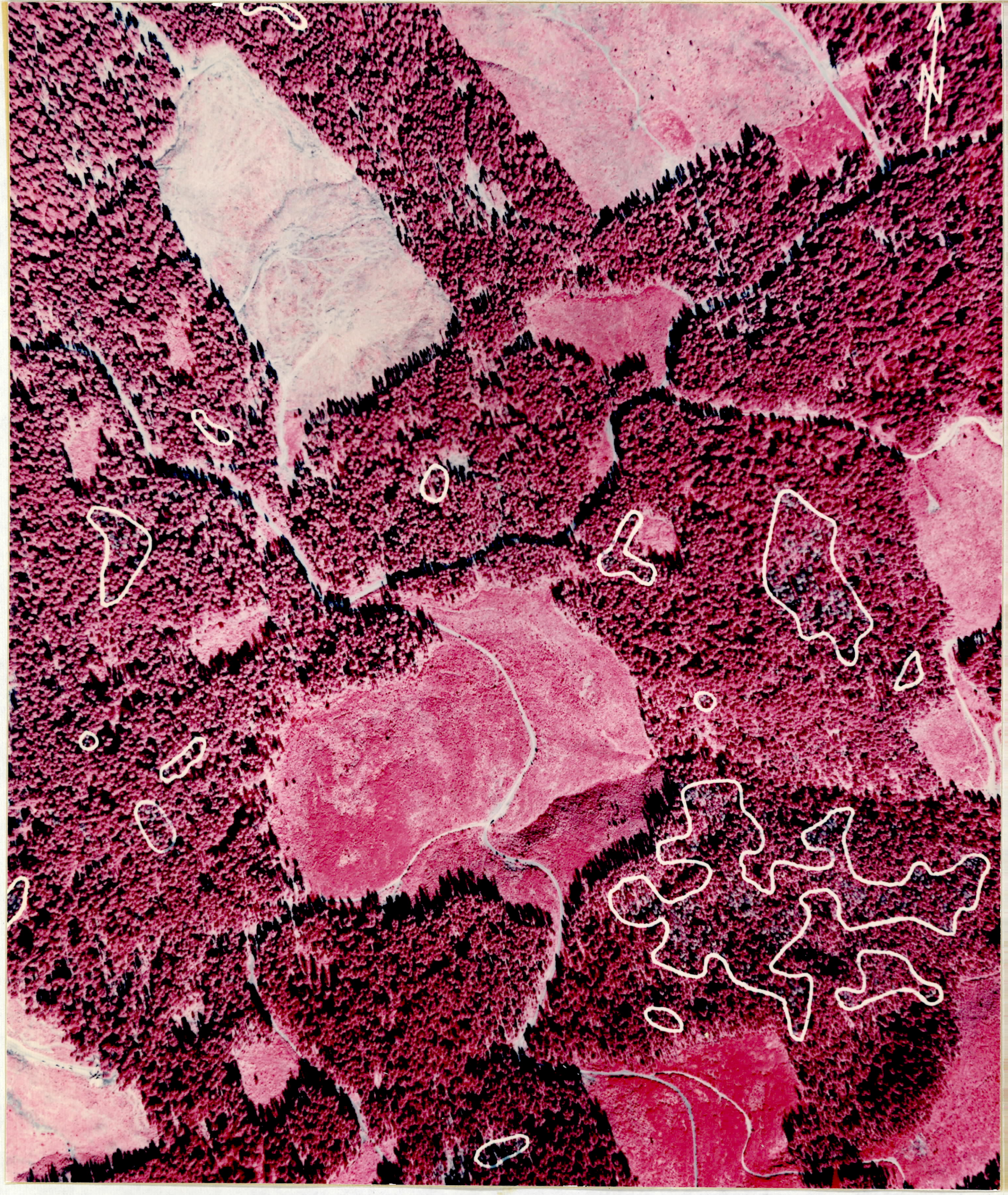

1. ACCESSIBLE
2. ACCESSIBLE WITH SYSTEM ROADS
3. INACCESSIBLE
South Butte 2625
BLACK CR F.C.
BM 2516
BM 2584
R 7½ E
Tenmile Cr
Panther Creek
Eightmile Creek
Hollis Creek
Whisky Cr
PANTHER CREEK DIVISION
WIND RIVER EXPERIMENTAL FOREST
Mouse Creek
Big Huckleberry Mtn 4202
(BIG HUCKLEBERRY 2)
BIG LAVA BED
CASCADE RANGE
Warren Gap
BM 1015
Pilot Knob
Weigle Hill
Cedar Creek
Cedar Cr
WIND RIVER NURSERY
Trout Cr
Creek
(PANTHER) 937
WIND
Bear Creek
SCALE
0
1
2
3
4 MILES

LOCATION OF AERIAL PHOTOS 1, 2, &3.

LEGEND

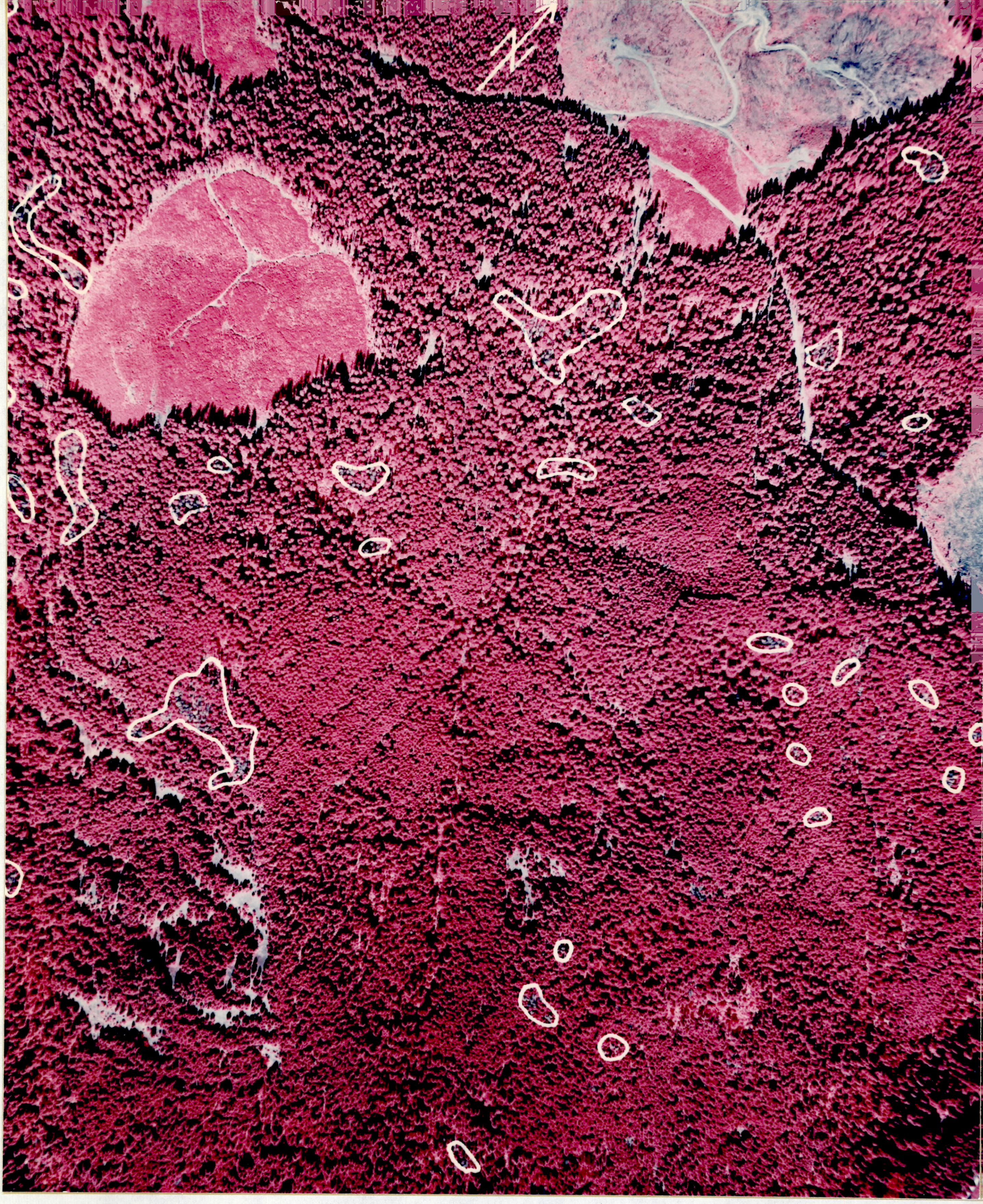
1.	Aerial photo number
—	Extent of aerial photo coverage
●	Douglas-fir beetle infestations
▨	Existing clear-cut areas

GIFFORD PINCHOT.



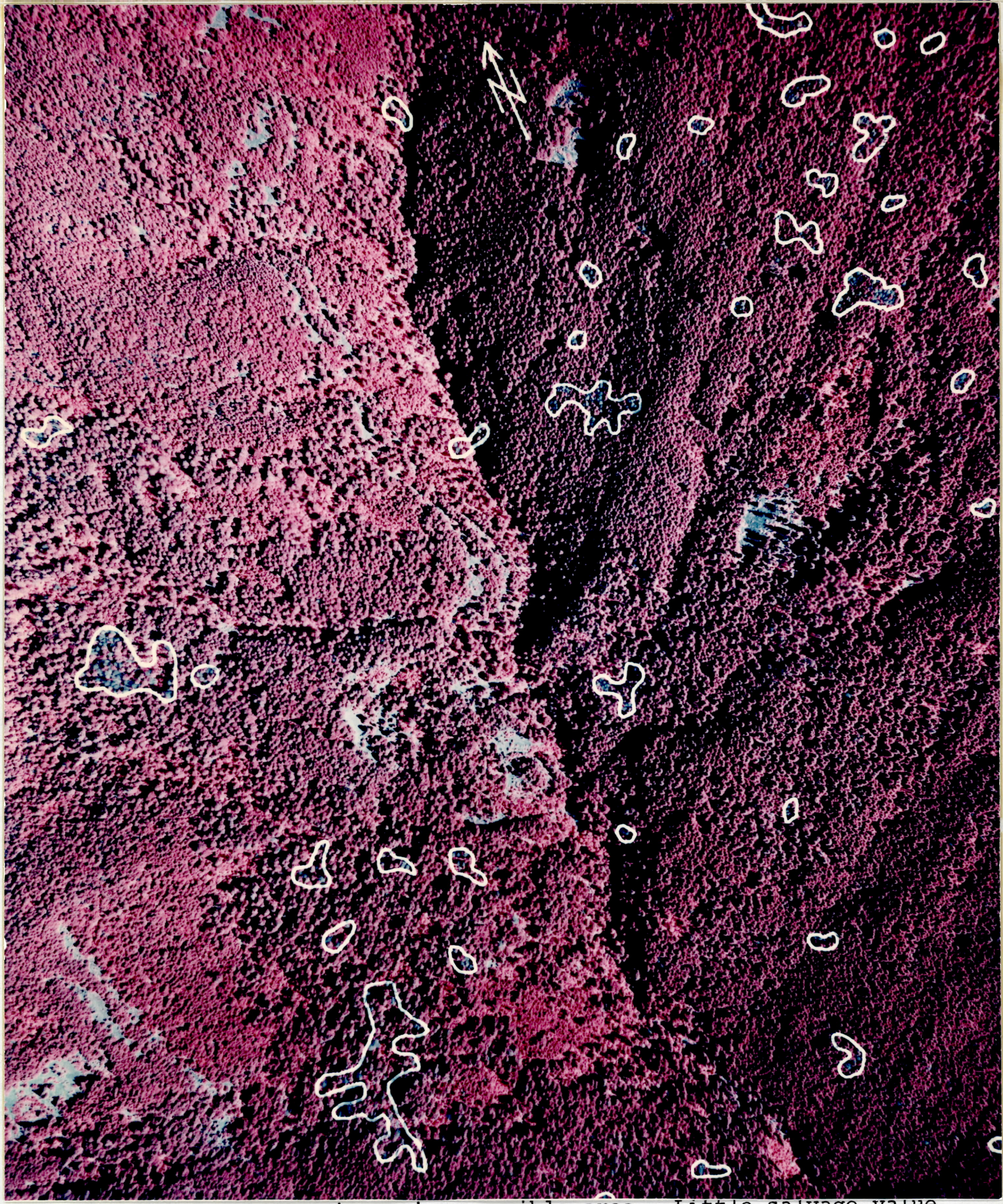
Beetle-killed trees in an accessible area. Shown on facing map. This special Ektachrome Infrared film is used to detect dead trees. Beetle-killed groups circled. Scale: 1" = 600'.

Aerial Photo 1.



Heavy beetle-kill in an area needing system road development before salvage is economical.

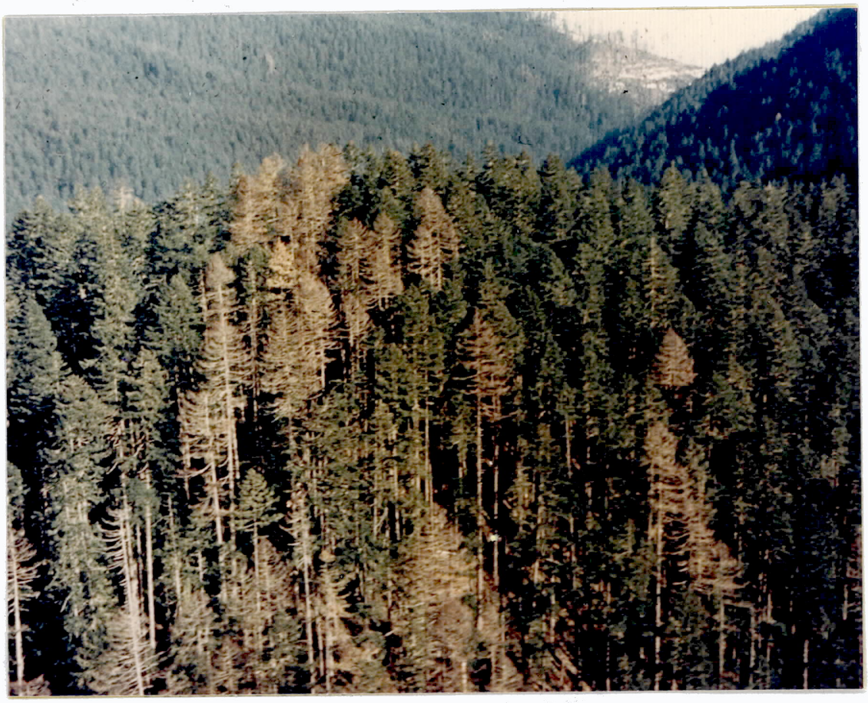
Aerial Photo 2.



Beetle-killed groups in an inaccessible area. Little salvage value will remain by the time harvesting begins.

Aerial Photo 3.

Some beetle-killed trees are accessible and easily salvaged.



Other Douglas-fir killed by the beetle cannot be salvaged until road systems are built.

PROGRESS TO DATE

A considerable volume of salvage has been removed from the six National Forests covered by this report during the period F.Y. 1965-1968. Some 892.4 million board feet of timber mortality was salvaged during that period. In addition, 240.6 million board feet of timber mortality is under contract but not yet cut and removed.

The Region received additional financing to assist in salvaging mortality in F.Y. 1969. The six National Forests discussed in this report received a total of $36,000 for this purpose. This was only a token recognition not only of the increased costs of preparing and administering salvage timber sales, but of the total job to be done. The additional funds carried no additional personnel ceilings. Present ceiling controls offer little opportunity for utilizing additional funds for an expanded timber salvage program. Additional personnel ceilings must accompany any increase in funds.

PLANNED FUTURE ACTION

Emphasis will continue to be placed on harvesting timber killed by insects and from other causes. This will involve (1) shifting the location of planned sales to salvage the maximum feasible volume of dead and dying timber in the regular sale program and (2) expand the pure salvage-sanitation sale program needed to meet objective of salvaging all dead and down material classed as accessible or accessible with road developments.

The Region must receive the following assistance if the above salvage objective is to be achieved:

1. Relief from or adjustment in personnel ceilings to permit assignment of special personnel to sanitation-salvage sales on a full-time basis.

2. Finances to adequately cover the salary and travel costs of the special field personnel.

3. Road construction funds to pay for location and design, construction engineering and supplemental road construction. Some of the timber in need of salvage will not pay for the needed construction. If appropriated funds are not made available to supplement road construction in such cases, the timber cannot be salvaged. Also, time is of the essence in building such roads so as to get the logs out of the woods before they become wholly unmerchantable.

   The estimated needs to cover personnel and financial needs over the next four fiscal years are shown in detail in the Appendix, Table 10, and summarized as follows:

Additional Personnel Ceiling	Additional Dollars to Finance Personnel	Road Funds Needed
37	$1,398,000	$936,000

A salvage program must receive the mutual attention of both the Forest Service and timber industry if it is to be effective. The Forest Service has the responsibility of making distressed timber available promptly under terms that will enable industry to purchase such timber. Industry has the responsibility of promptly harvesting such timber to minimize economic losses to both themselves and the Government.

Regional Forester Connaughton established priorities for sale preparation in his September 25, 1968, memorandum to the Forest Supervisors. As previously mentioned, the highest priority was given to preparation of insect-infested and recent fire-killed timber, followed by regularly scheduled sales. Sales of older dead and down meterial were given low priority because of higher cost and manpower requirements for the amount of volume produced. To facilitate meeting these priorities and stretch dollars and manpower, simplified sale preparation procedures were authorized on November 4, 1968, for sanitation-salvage sales. These included liberalization of timber excising standards and simplified appraisal procedures.

The current Douglas-fir beetle epidemic has resulted in a shift of effort within the Region to promptly salvage mortality before tree deterioration. Associated older dead and down material has been included in these sales. Table 3 shows a projected program based on current levels of financing and manpower and does not include all mortality volume.

Table 3.--Summary of Current Timber Salvage Sales Program with Present Financing and Management

Fiscal year	Volume available	Sold to date	Range of beetle kill in salvage sale volume
	MM bd. ft.	MM bd. ft.	Pct.
1969	256.6	41.7	1 - 10
1970	183.9	--	2 - 20
1971	182.8	--	2 - 11
1972	174.9	--	1 - 8
Total	798.2	41.7	1 - 20

Table 4 shows additional volume that could be salvaged if additional personnel ceilings and appropriate funding are made available. Even so, a special effort must be made to keep pace with timber losses occurring in Region 6. It should be noted that the additional program shown in Table 4 provides only for needs on the six National Forests covered in this report. Other National Forests in the Douglas-fir subregion and those in the ponderosa pine subregion have similar problems and needs.

Table 4.--Summary of proposed additional salvage sale program

Fiscal year	Total additional salvage volume	Additional timber sale money needed	Additional personnel needed	Road money needed
	MM bd. ft.	$	No.	$
1969	241.2	150,000	25	145,000
1970	236.0	372,000	4	178,000
1971	242.0	408,000	3	339,000
1972	242.0	468,000	5	274,000
Total	961.2	1,398,000	37	936,000

Table 4 represents approximately one-third of the total additional program that would be necessary to meet the Region's objective of removing insect-infested trees in a timely manner for control purposes as well as salvaging all merchantable mortality. It must be recognized here that Industry must cooperate to the fullest extent if the Region's objective is to be obtained.

Beetle-killed timber should be removed to reduce insect populations (right) and save timber values (below).

Mobile equipment used to harvest tree mortality on Gifford Pinchot National Forest.

Beetle-killed Douglas-fir salvaged along a road system.

SUMMARY

There is a continuing problem in the National Forests of Oregon and Washington of harvesting insect-infested, diseased, recently fire-killed and older dead and down timber. The Forest Service is continuing to place emphasis on such harvest to the extent possible within personnel ceilings and fund restrictions.

Simplified sale preparation procedures have been authorized for sanitation-salvage sales to stretch limited funds and manpower. Current program levels will permit the salvage of an estimated 798 million board feet of mortality through 1972 on the six National Forests covered in this report. An additional 961 million board feet of mortality cannot be salvaged on these National Forests during that period without additional finances and personnel ceilings unless normal green sale activity is sharply curtailed. Industrial needs for timber prohibit drastic changes in the normal sales program. Thus, increases in the salvage effort will require additional appropriated funds and personnel ceilings.

We estimate that ceilings are needed for 25 additional personnel in F.Y. 1969 to prepare and administer such sales. Ceilings for 12 additional men will be needed from F.Y. 1970 to F.Y. 1972. About $2.33 million will be necessary to finance their work and provide supplemental financing for road construction (Appendix, Table 10). These additional personnel and funds will meet the needs of only six of the 19 National Forests in Region 6 through 1972. A Region-wide salvage program would require nearly three times as many people and dollars.

The cost-benefits of an accelerated timber salvage program are definitely favorable. Such ratios range from 3 to more than 20, depending on a number of factors and related only to direct costs and return to the Treasury. Indirect benefits in terms of added employment and addition to the Gross National Product make the ratios even more favorable.

APPENDIX

Table 5.--Extent of insect outbreaks other than Douglas-fir beetle in 1968

National Forest	Fir Engraver	Mountain Pine Beetle	Western Pine Beetle	Silver Fir Beetles	Balsam Woolly Aphid	Hemlock Looper	Dying Hemlock	Total
				- - - - - Acres - - - - -				
Gifford Pinchot	--	5,540	680	--	22,750	--	--	28,970
Mt. Baker	20	--	--	1,080	--	2,240	47,660	51,000
Mt. Hood	5,810	17,030	2,480	--	28,950	--	--	54,270
Siskiyou	--	2,260	--	--	170	--	--	2,430
Rogue River	5,580	3,870	1,490	--	2,590	--	--	13,530
Umpqua	740	6,250	40	--	10,000	--	--	17,030
Totals	12,150	34,950	4,690	1,080	64,460	2,240	47,660	167,230

Table 6.--Accessible Douglas-fir beetle and other insect mortality

National Forest	FY 1969		FY 1970		FY 1971		FY 1972		TOTAL	
	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.
Mt. Baker	4.1	8.1	1.0	2.0	.2	.5	.2	.5	5.5	11.1
Gifford Pinchot	14.0	80.0	5.0	25.0	3.0	20.0	1.0	5.0	23.0	130.0
Mt. Hood	14.8	7.4	15.0	7.5	7.0	3.5	7.0	3.5	43.8	21.9
Umpqua	9.3	16.2	8.6	14.3	4.1	7.2	3.6	6.6	25.6	44.3
Rogue River	6.5	15.0	6.0	14.0	3.0	8.0	4.0	10.0	19.5	47.0
Siskiyou	3.0	15.9	1.3	8.0	.9	4.8	.8	4.2	6.0	32.9
Subtotal	51.7	142.6	36.9	70.8	18.2	44.0	16.6	29.8	123.4	287.2
Other Mortality										
Mt. Baker	.1	3.0	.2	6.0	.3	9.0	.2	6.0	.8	24.0
Gifford Pinchot	5.0	5.0	4.0	4.0	3.0	3.0	2.0	2.0	14.0	14.0
Mt. Hood	16.2	32.4	16.0	32.0	12.0	24.0	12.0	24.0	56.2	112.4
Umpqua	7.3	19.7	7.5	21.4	8.0	25.0	8.0	24.9	30.8	91.0
Rogue River	240.0	32.0	275.0	23.0	303.0	26.0	310.0	27.0	1,128.0	108.0
Siskiyou	23.0	23.3	3.8	14.0	3.4	12.0	3.2	10.0	33.4	59.3
Subtotal	291.6	115.4	306.5	100.4	329.7	99.0	335.4	93.9	1,263.2	408.7
Total	343.3	258.0	343.4	171.2	347.9	143.0	352.0	123.7	1,386.6	695.9

Table 7.--Douglas-fir beetle and other insect mortality--accessible with road extensions

National Forest	FY 1969		FY 1970		FY 1971		FY 1972		TOTAL	
	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	M. Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd. Ft.
Mt. Baker	--	--	--	--	--	--	--	--	--	--
Gifford Pinchot	9.0	35.0	6.0	15.0	5.0	10.0	2.0	5.0	22.0	65.0
Mt. Hood	24.7	12.3	24.0	12.0	12.0	6.0	12.0	6.0	72.7	36.3
Umpqua	9.6	18.9	8.5	16.0	4.0	7.3	3.1	4.0	25.2	46.2
Rogue River	--	--	--	--	1.0	2.0	1.0	2.0	2.0	4.0
Siskiyou	.1	2.0	.1	2.0	.1	2.0	.1	1.0	.4	7.0
Subtotal	43.4	68.2	38.6	45.0	22.1	27.3	18.2	18.0	122.3	158.5
Other Mortality										
Mt. Baker	1.5	46.2	3.0	90.0	4.0	120.0	3.0	90.0	11.5	346.2
Gifford Pinchot	20.0	40.0	20.0	40.0	15.0	30.0	10.0	20.0	65.0	130.0
Mt. Hood	27.1	56.2	22.0	54.0	22.0	44.0	22.0	44.0	93.1	198.2
Umpqua	5.9	2.2	5.4	2.0	3.9	1.3	3.8	1.2	19.0	6.7
Rogue River	--	--	--	--	6.0	.5	4.0	.5	10.0	1.0
Siskiyou	.2	2.0	.2	2.0	.2	2.0	.2	2.0	.8	8.0
Subtotal	54.7	146.6	50.6	188.0	51.1	197.8	43.0	157.7	199.4	690.1
Total	98.1	214.8	89.2	233.0	73.2	225.1	61.2	175.7	321.7	848.6

Table 8.--Douglas-fir beetle and other insect mortality--Inaccessible

National Forest	FY 1969		FY 1970		FY 1971		FY 1972		TOTAL	
	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd.Ft.	M.Acres	MM Bd. Ft.
Mt. Baker	.5	1.0	.2	.5	.2	.5	.3	.5	1.2	2.5
Gifford Pinchot	2.0	10.0	2.0	10.0	2.0	5.0	1.0	5.0	7.0	30.0
Mt. Hood	9.9	3.8	9.0	3.0	5.0	2.5	12.0	6.0	35.9	15.3
Umpqua	13.3	6.7	6.0	2.8	2.5	1.4	1.5	1.2	23.3	12.1
Rogue River	2.6	6.0	2.5	6.5	--	--	--	--	5.1	12.5
Siskiyou	10.8	9.6	3.0	5.6	2.5	4.1	2.0	2.8	18.3	22.1
Subtotal	39.1	37.1	22.7	28.4	12.2	13.5	16.8	15.5	90.8	94.5
Other Mortality										
Mt. Baker	1.7	33.6	1.9	39.6	2.3	45.6	2.3	45.6	8.2	164.4
Gifford Pinchot	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0	60.0	120.0
Mt. Hood	10.8	21.6	10.0	20.0	8.0	16.0	8.0	16.0	36.8	73.6
Umpqua	8.9	3.0	2.5	2.3	1.8	1.4	1.4	1.3	14.6	8.0
Rogue River	100.0	13.0	30.0	3.0	11.0	1.0	--	--	141.0	17.0
Siskiyou	180.0	110.0	176.0	124.0	172.0	137.0	168.0	149.0	696.0	520.0
Subtotal	316.4	211.2	235.4	218.9	210.1	231.0	194.7	241.9	956.6	903.0
Total	355.5	248.3	258.1	247.3	222.3	244.5	211.5	257.4	1,047.4	997.5

Table 9--Summary of Current Timber Salvage Program With Present Financing and Management

Fiscal Year and Forest	Total Salvage Volume Available	Sold to Date	Est. Beetle Salvage
	MM bd. ft.	MM bd. ft.	Pct.
1969			
Mt. Baker	11.1	4.8	2
Gifford Pinchot	97.0	10.0	20
Mt. Hood	49.0	13.5	1
Umpqua	61.5	10.1	10
Rogue River	8.0	1.3	10
Siskiyou	30.0	2.0	7
Total	256.6	41.7	50
1970			
Mt. Baker	17.0	-	2
Gifford Pinchot	30.0	-	5
Mt. Hood	50.0	-	2
Umpqua	58.9	-	9
Rogue River	8.0	-	20
Siskiyou	20.0	-	4
Total	183.9	-	42
1971			
Mt. Baker	34.0	-	2
Gifford Pinchot	30.0	-	5
Mt. Hood	50.0	-	1
Umpqua	54.8	-	11
Rogue River	4.0	-	5
Siskiyou	10.0	-	3
Total	182.8	-	27
1972			
Mt. Baker	32.0	-	2
Gifford Pinchot	30.0	-	5
Mt. Hood	50.0	-	1
Umpqua	55.9	-	8
Rogue River	4.0	-	5
Siskiyou	3.0	-	1
Total	174.9	-	22
GRAND TOTAL	798.2	41.7	

Table 10--Proposed Additional Salvage Sale Program

Fiscal Year and Forest	Total Salvage Volume Available	Additional Timber Sale Money Needed 1/	Additional Personnel Needed	Road Money Needed
	MM bd. ft.	$	No.	$
1969				
Mt. Baker	9.1	None	None	-
Gifford Pinchot	97.0	42,000	7	-
Mt. Hood	90.0	36,000	6	20,000
Umpqua	30.1	30,000	5	17,000
Rogue River	10.0	18,000	3	100,000
Siskiyou	5.0	24,000	4	8,000
Total	241.2	150,000	25	145,000
1970				
Mt. Baker	24.0	24,000	None	31,000
Gifford Pinchot	57.0	84,000	None	-
Mt. Hood	90.0	72,000	None	20,000
Umpqua	40.0	84,000	2	19,000
Rogue River	14.0	48,000	1	100,000
Siskiyou	11.0	60,000	1	8,000
Total	236.0	372,000	4	178,000
1971				
Mt. Baker	28.0	36,000	1	186,000
Gifford Pinchot	54.0	84,000	None	-
Mt. Hood	90.0	72,000	None	20,000
Umpqua	39.0	84,000	None	17,000
Rogue River	20.0	72,000	2	100,000
Siskiyou	11.0	60,000	None	16,000
Total	242.0	408,000	3	339,000
1972				
Mt. Baker	24.0	36,000	None	124,000
Gifford Pinchot	36.0	84,000	None	-
Mt. Hood	90.0	72,000	None	20,000
Umpqua	37.0	84,000	None	14,000
Rogue River	40.0	120,000	4	100,000
Siskiyou	15.0	72,000	1	16,000
Total	242.0	468,000	5	274,000
GRAND TOTAL	961.2	1,398,000	37	936,000

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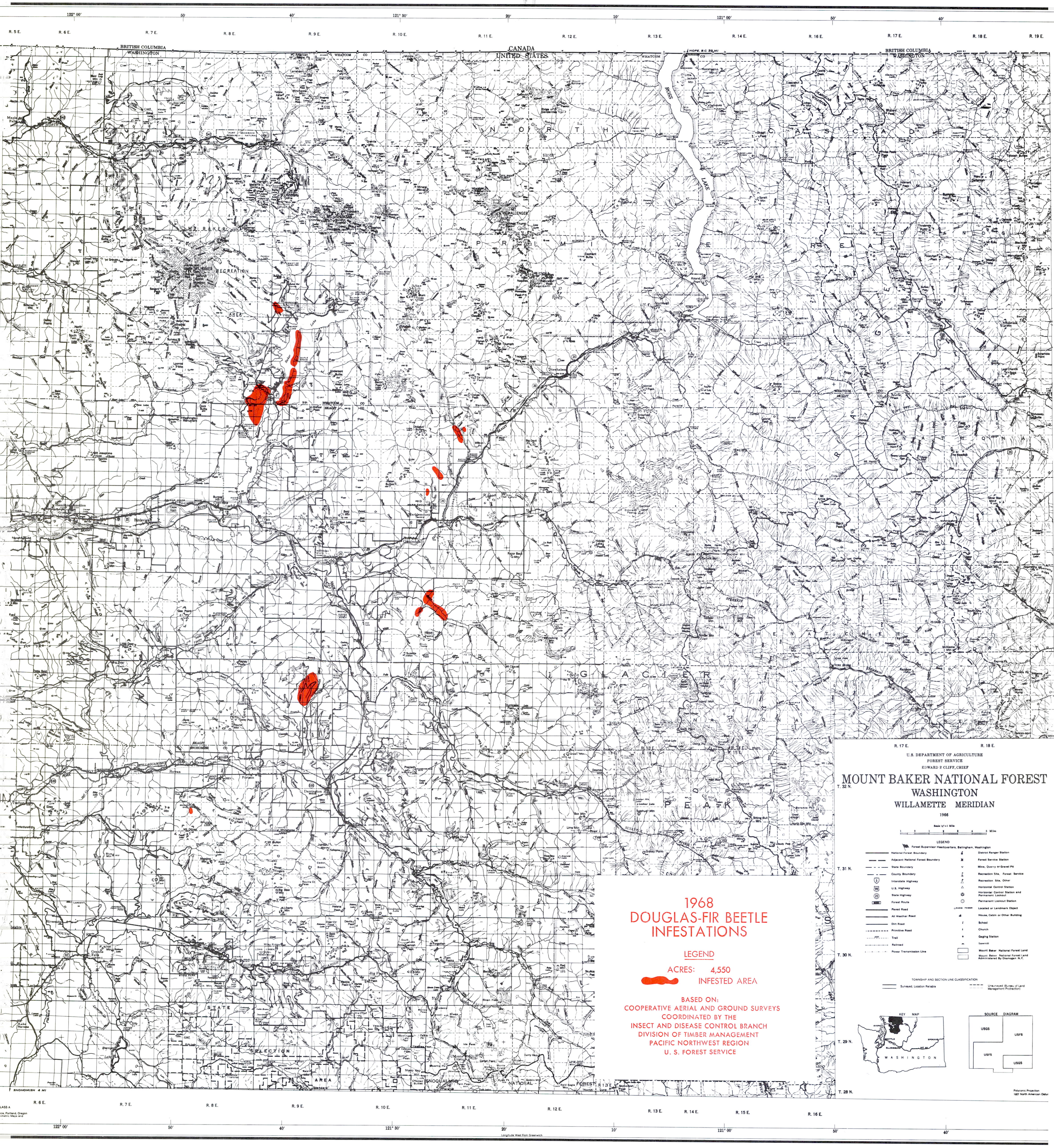
[1] Includes no costs above District level. Does not include housing costs needed in some areas.



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R. 16 E.
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BRITISH COLUMBIA
WASHINGTON
CANADA
UNITED STATES
WHATCOM
ROSS LAKE
NORTH CASCADE
PRIMITIVE AREA
MT. BAKER
RECREATION AREA
GLACIER PEAK
STATE
SELECTION AREA
SNOQUALMIE NATIONAL FOREST
Longitude West from Greenwich
KEY MAP
EVERETT
SEATTLE
ELLENSBURG
SPOKANE
WASHINGTON
SOURCE DIAGRAM
USGS
USFS
USFS
USGS

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF

MOUNT BAKER NATIONAL FOREST
WASHINGTON
WILLAMETTE MERIDIAN

1966

Scale ½" = 1 Mile

LEGEND

Forest Supervisor Headquarters, Bellingham, Washington

	National Forest Boundary		District Ranger Station
	Adjacent National Forest Boundary		Forest Service Station
	State Boundary		Mine, Quarry or Gravel Pit
	County Boundary		Recreation Site, Forest Service
5	Interstate Highway		Recreation Site, Other
99	U.S. Highway	△	Horizontal Control Station
20	State Highway		Horizontal Control Station and Permanent Lookout
	Forest Route		Permanent Lookout Station
	Paved Road	○RADIO TOWER	Located or Landmark Object
	All Weather Road		House, Cabin or Other Building
	Dirt Road		School
	Primitive Road		Church
2001	Trail		Gaging Station
	Railroad		Sawmill
	Power Transmission Line	☐	Mount Baker National Forest Land
		☐	Mount Baker National Forest Land Administered By Okanogan N.F.

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable

Unsurveyed (Bureau of Land Management Protraction)

Polyconic Projection
1927 North American Datum

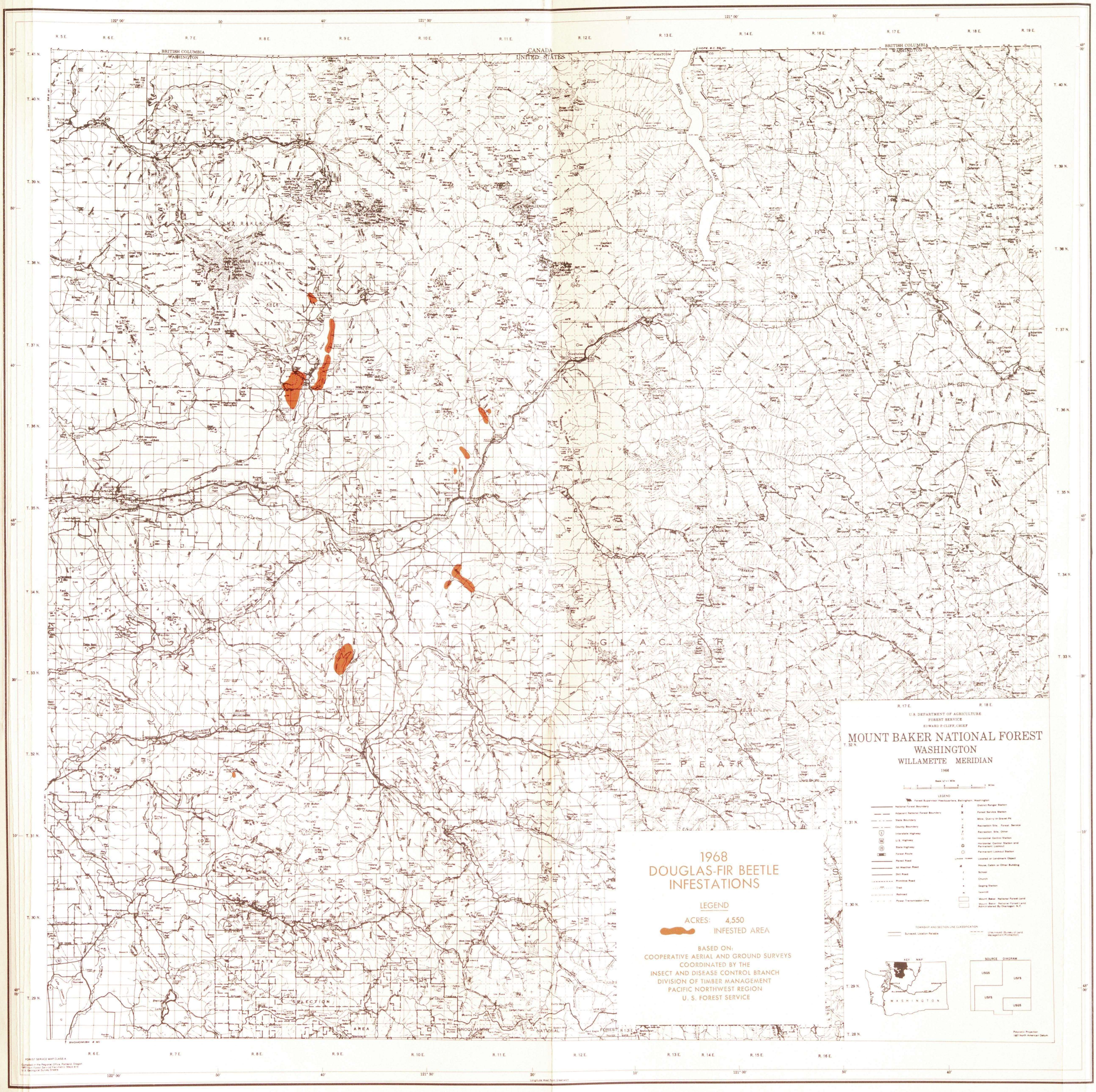
1968 DOUGLAS-FIR BEETLE INFESTATIONS

LEGEND

ACRES: 4,550

INFESTED AREA

BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE



1968
DOUGLAS-FIR BEETLE INFESTATIONS

LEGEND

ACRES: 4,550

● INFESTED AREA

BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF

MOUNT BAKER NATIONAL FOREST
WASHINGTON
WILLAMETTE MERIDIAN

1966

Scale ½" = 1 Mile
Miles
LEGEND
Forest Supervisor Headquarters, Bellingham, Washington
National Forest Boundary
Adjacent National Forest Boundary
State Boundary
County Boundary
Interstate Highway
U.S. Highway
State Highway
Forest Route
Paved Road
All Weather Road
Dirt Road
Primitive Road
Trail
Railroad
Power Transmission Line
District Ranger Station
Forest Service Station
Mine, Quarry or Gravel Pit
Recreation Site, Forest Service
Recreation Site, Other
Horizontal Control Station
Horizontal Control Station and Permanent Lookout
Permanent Lookout Station
Located or Landmark Object
House, Cabin or Other Building
School
Church
Gaging Station
Sawmill
Mount Baker National Forest Land
Mount Baker National Forest Land Administered By Okanogan N.F.
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Unsurveyed (Bureau of Land Management Protraction)
KEY MAP
WASHINGTON
SOURCE DIAGRAM
USGS
USFS
USFS
USGS
Polyconic Projection
1927 North American Datum
CANADA
UNITED STATES
BRITISH COLUMBIA
WASHINGTON
NORTH CASCADES
MT. BAKER RECREATION AREA
GLACIER PEAK
SNOHOMISH 4 MI
122° 00′
121° 30′
121° 00′
R. 6 E.
R. 7 E.
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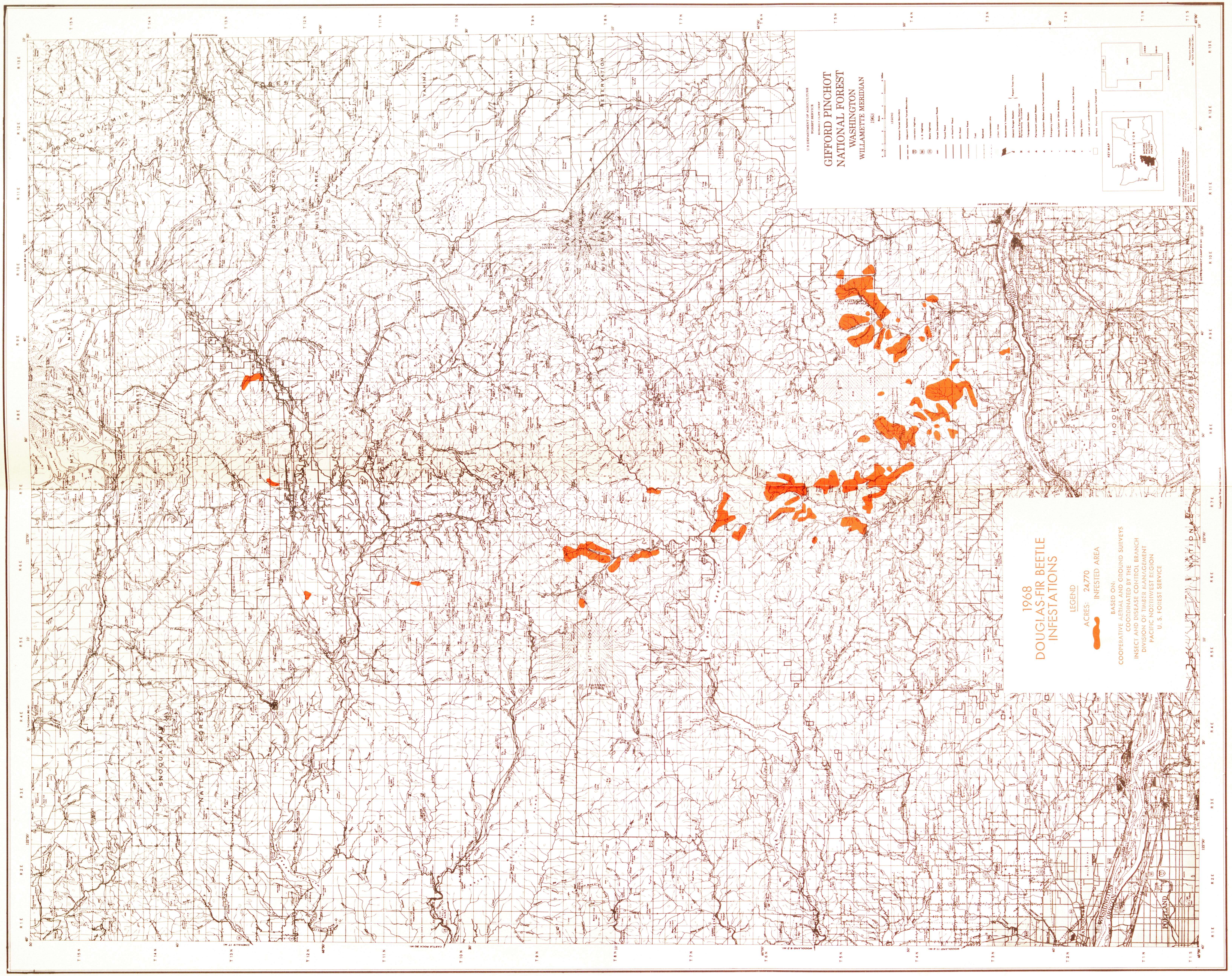
FOREST SERVICE MAP CLASS A

Compiled in the Regional Office, Portland, Oregon 1957 from Forest Service Planimetric Maps and U.S. Geological Survey Sheets



1968
DOUGLAS-FIR BEETLE INFESTATIONS

LEGEND

ACRES: 24,770

● INFESTED AREA

BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE

U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF
GIFFORD PINCHOT
NATIONAL FOREST
WASHINGTON
WILLAMETTE MERIDIAN
1963
LEGEND
National Forest Boundary
Adjacent National Forest Boundary
Interstate Highway
U. S. Highway
KEY MAP
MT. RAINIER
SNOQUALMIE
MT. ST. HELENS
MT. ADAMS
YAKIMA INDIAN RESERVATION
HOOD
PORTLAND
WASHINGTON
OREGON
T 5 N
T 4 N
T 3 N
T 2 N
T 1 N
T 1 S
T 14 N
T 13 N
T 12 N
T 11 N
T 10 N
T 9 N
T 8 N
T 7 N
T 6 N
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R 7 E
R 8 E
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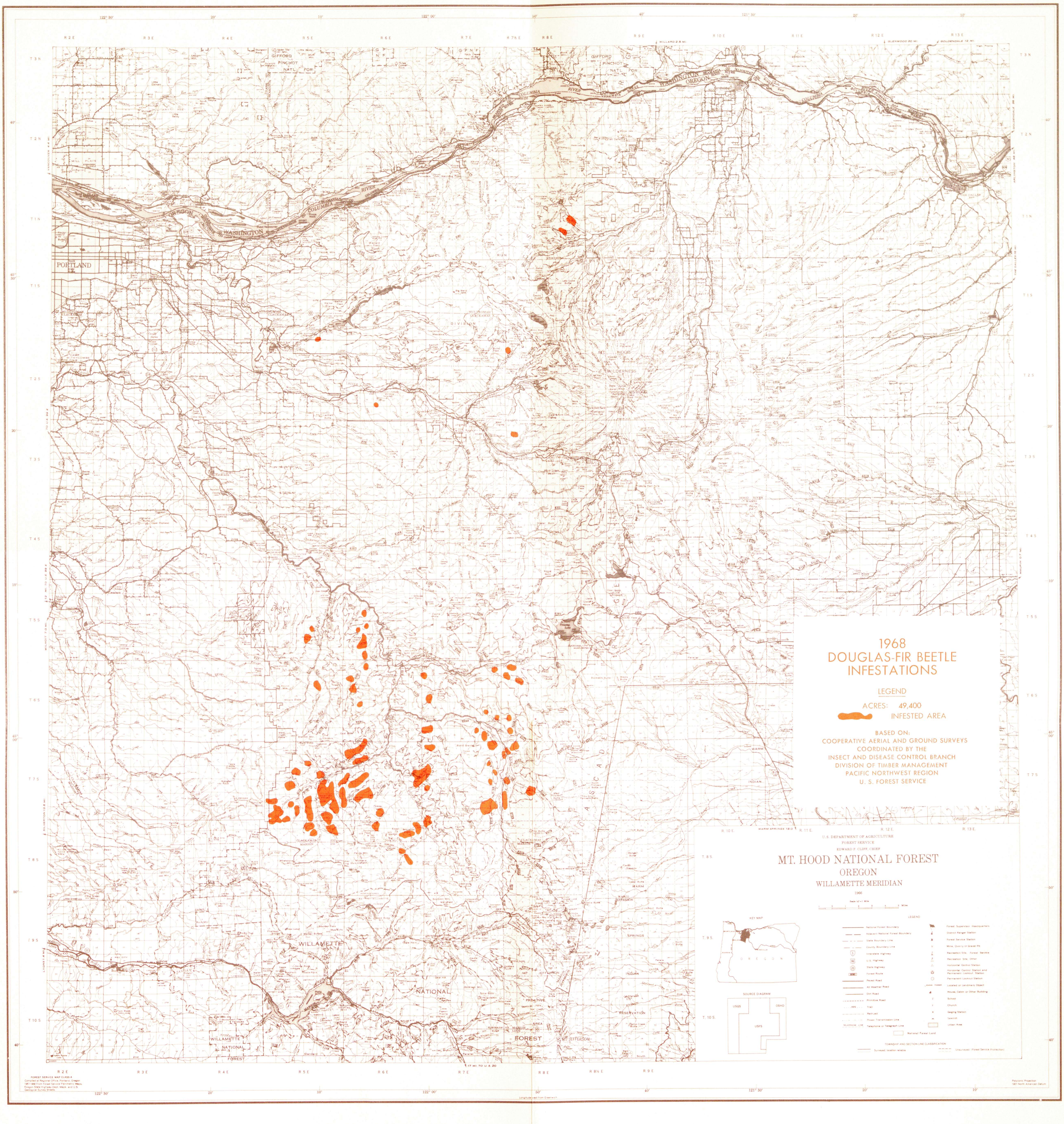
R 11 E
R 12 E
122°00'
122°30'
46°30'



1968
DOUGLAS-FIR BEETLE
INFESTATIONS

LEGEND

ACRES: 49,400

▬ INFESTED AREA

BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF
MT. HOOD NATIONAL FOREST
OREGON
WILLAMETTE MERIDIAN
1966
Scale ¼" = 1 Mile
KEY MAP
LEGEND
National Forest Boundary
Adjacent National Forest Boundary
State Boundary Line
County Boundary Line
Interstate Highway
U.S. Highway
State Highway
Forest Route
Forest Supervisor Headquarters
District Ranger Station
Forest Service Station
Mine, Quarry or Gravel Pit
Recreation Site, Forest Service
Recreation Site, Other
Horizontal Control Station
Horizontal Control Station and Permanent Lookout Station
SOURCE DIAGRAM
PORTLAND
WASHINGTON
OREGON
COLUMBIA RIVER
GIFFORD PINCHOT NATL FOR
WILLAMETTE NATIONAL FOREST
WARM SPRINGS
INDIAN RESERVATION
MT. HOOD WILDERNESS
DIVISION
R 2 E
R 3 E
R 4 E
R 5 E
R 6 E
R 7 E
R 8 E
R 9 E
R 10 E
R 11 E
R 12 E
R 13 E
T 3 N
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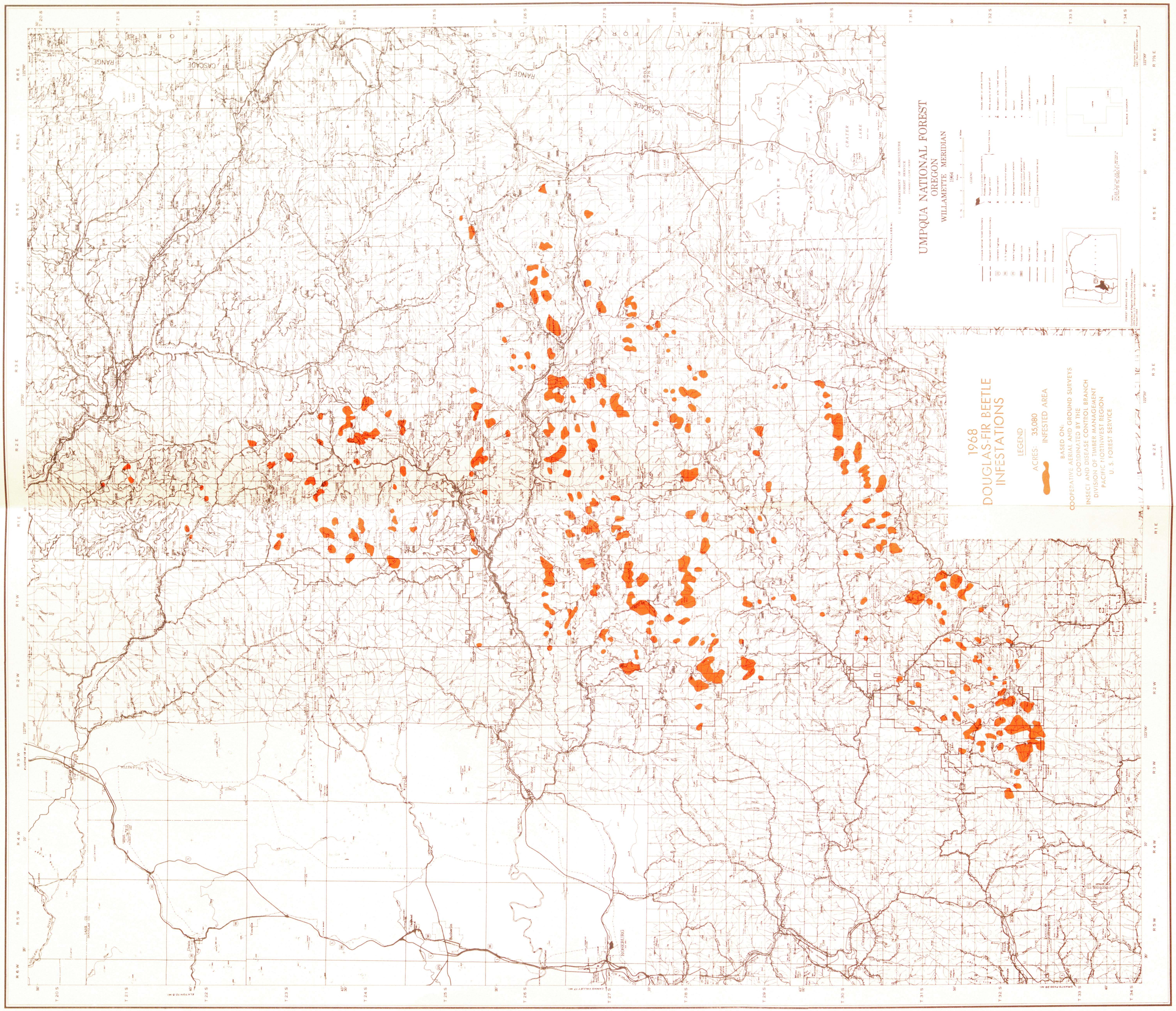
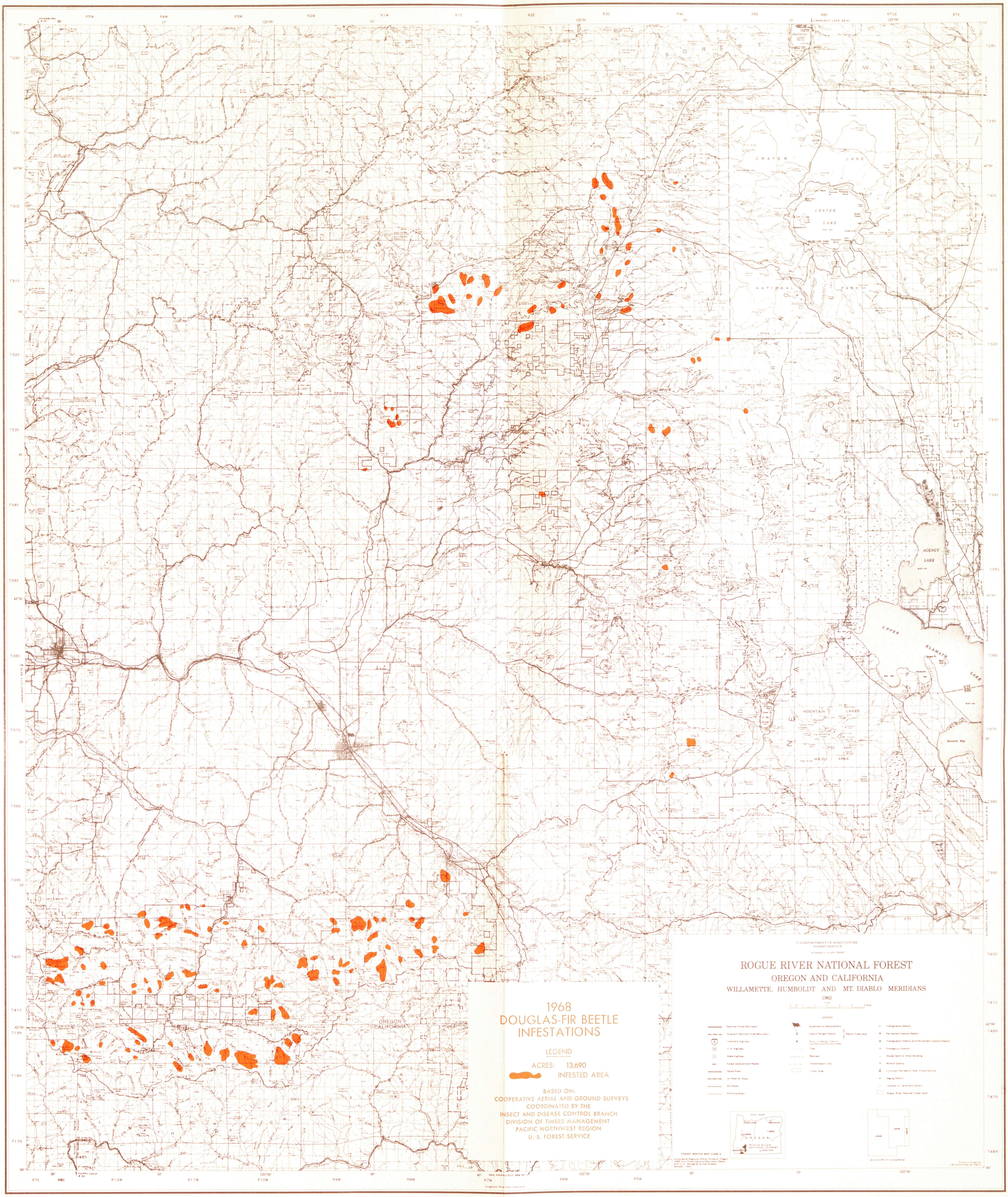
T 10 S
122° 30'
122° 00'
121° 30'


1968
DOUGLAS-FIR BEETLE
INFESTATIONS
LEGEND
ACRES: 35,080
INFESTED AREA
BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE
U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF
UMPQUA NATIONAL FOREST
OREGON
WILLAMETTE MERIDIAN
1964
LEGEND
ROSEBURG
CRATER LAKE NATIONAL PARK
CASCADE RANGE
KLAMATH FALLS 65 MI.
FOREST SERVICE MAP CLASS


U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF
ROGUE RIVER NATIONAL FOREST
OREGON AND CALIFORNIA
WILLAMETTE, HUMBOLDT AND MT. DIABLO MERIDIANS
1963
Scale
0 ½ 1 2 3 4 5 6 Miles
LEGEND
National Forest Boundary
Adjacent National Forest Boundary
Interstate Highway
U. S. Highway
State Highway
Forest Development Roads
Paved Road
All Weather Road
Dirt Road
Primitive Road
Supervisor's Headquarters
District Ranger Station
Guard or Ranger Station not Permanently Occupied
Report Fires Here
Trail
Railroad
Transmission Line
Urban Area
Triangulation Station
Permanent Lookout Station
Triangulation Station and Permanent Lookout Station
Emergency Lookout
House Cabin or Other Building
Mine or Quarry
Improved Recreation Site, Forest Service
Gaging Station
Located or Landmark Object
Rogue River National Forest Land
KEY MAP
PORTLAND
PENDLETON
EUGENE
BEND
OREGON
ROGUE RIVER NATIONAL FOREST
MEDFORD
LAKEVIEW
AUTHORITY DIAGRAM
USGS
USFS
USGS
FOREST SERVICE MAP CLASS A
Compiled at Regional Office, Portland, Oregon 1958 from Forest Service Planimetric Maps and U. S. Geological Survey Sheets
Revised 1963
Polyconic Projection
1927 North American Datum
1968
DOUGLAS-FIR BEETLE
INFESTATIONS
LEGEND
ACRES: 13,690
INFESTED AREA
BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE
CRATER LAKE NATIONAL PARK
AGENCY LAKE
UPPER KLAMATH LAKE
MOUNTAIN LAKES WILD AREA
OREGON
CALIFORNIA
SAN FRANCISCO 348 MI
Longitude West from Greenwich
KLAMATH FALLS 5 MI
122°00'
122°30'
42°00'
R7W
R6W
R5W
R6E
R7E
R8E
T39S
T40S
T41S
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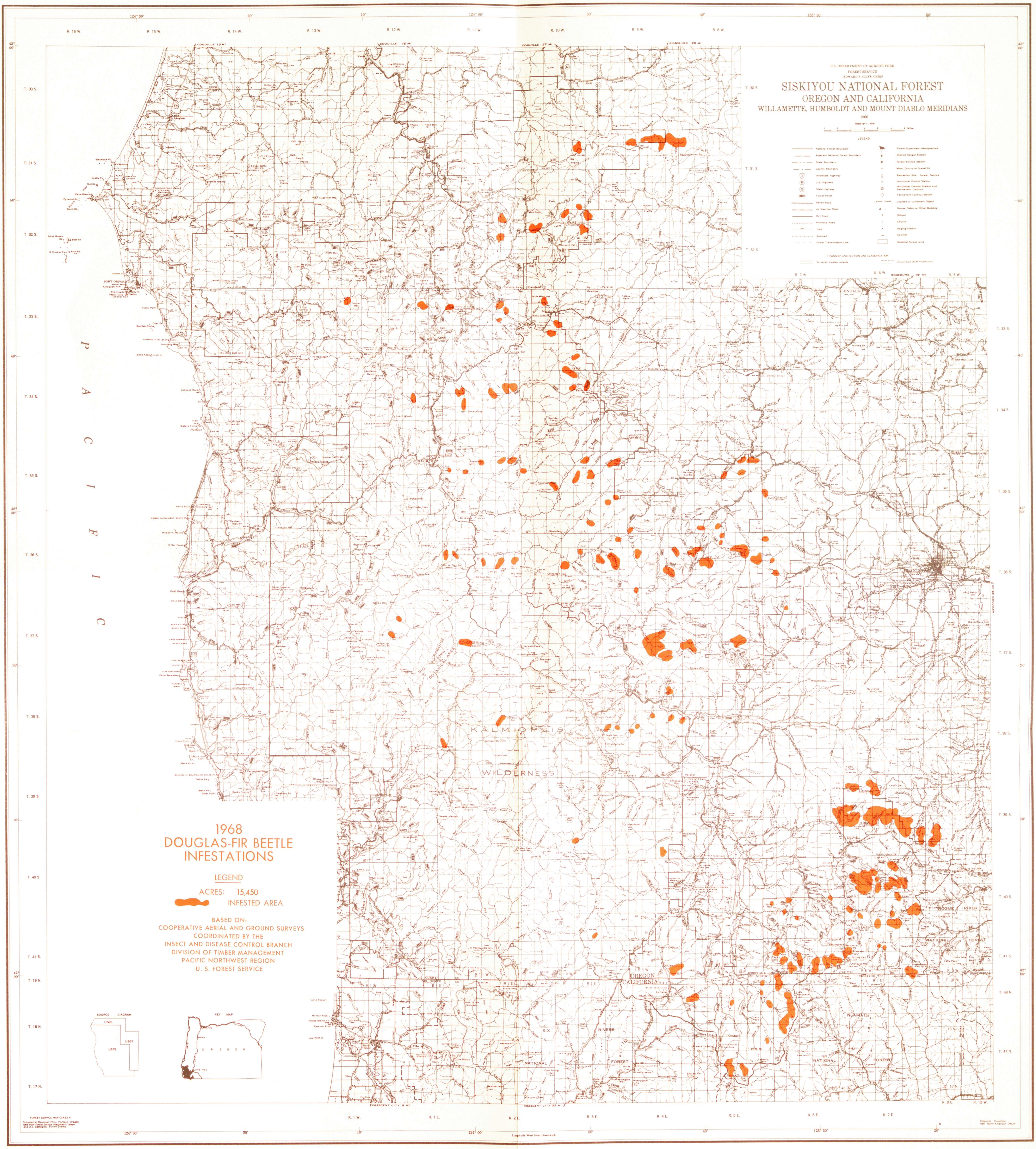

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF

SISKIYOU NATIONAL FOREST
OREGON AND CALIFORNIA
WILLAMETTE, HUMBOLDT AND MOUNT DIABLO MERIDIANS

1966

Scale ½" = 1 Mile
1 0 1 2 3 4 5 Miles
LEGEND
National Forest Boundary
Adjacent National Forest Boundary
State Boundary
County Boundary
Interstate Highway
U.S. Highway
State Highway
Forest Route
Paved Road
All Weather Road
Dirt Road
Primitive Road
Trail
Railroad
Power Transmission Line
Forest Supervisor Headquarters
District Ranger Station
Forest Service Station
Mine, Quarry or Gravel Pit
Recreation Site, Forest Service
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Permanent Lookout Station
Located or Landmark Object
House, Cabin or Other Building
School
Church
Gaging Station
Sawmill
National Forest Land
TOWNSHIP AND SECTION LINE CLASSIFICATION
PACIFIC
KALMIOPSIS
WILDERNESS
OREGON
CALIFORNIA
ROGUE RIVER NATIONAL FOREST
SIX RIVERS NATIONAL FOREST
KLAMATH NATIONAL FOREST
SOURCE DIAGRAM
KEY MAP
Longitude West from Greenwich

1968
DOUGLAS-FIR BEETLE INFESTATIONS

LEGEND

ACRES: 15,450
▬ INFESTED AREA

BASED ON:
COOPERATIVE AERIAL AND GROUND SURVEYS
COORDINATED BY THE
INSECT AND DISEASE CONTROL BRANCH
DIVISION OF TIMBER MANAGEMENT
PACIFIC NORTHWEST REGION
U. S. FOREST SERVICE

FOREST SERVICE MAP CLASS A
Compiled at Regional Office, Portland, Oregon
1966 from Forest Service Planimetric Maps,
and U.S. Geological Survey Sheets.